

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. APPLICATION NO. 09/817,591
ATTORNEY DOCKET NO. CA1122

As discussed previously in the Rule 111 Response filed on December 22, 2004, claim 1 recites a method of creating a generic text summary of a document, wherein the method comprises creating a weighted document term-frequency vector for the document; for each sentence in the document, creating a weighted sentence term-frequency vector, and computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector. Applicants submit, however, that Billheimer *et al.* fail to teach or suggest at least these features of the invention as recited in claim 1.

As shown at step 102 of Figure 1 of the instant application, a weighted term-frequency vector A_i is created for each sentence $i \in S$, and a weighted term-frequency vector D is created for the document. At step 103, a relevance score between A_i and D is computed for each sentence $i \in S$.

In contrast, Billheimer *et al.* only teach a term-frequency matrix A defined from a set of documents. Each entry in A is the raw frequency of a term in a given document, *i.e.*, A_{ij} is the number of times a term t_i occurs in a D_j . See Billheimer *et al.*, col. 11, lines 2-11. The text mining operation (step 118 of Fig. 3 of Billheimer *et al.*), the re-indexing operation (step 112 of Fig. 3 of Billheimer *et al.*) and the update indexing operation (step 118 of Fig. 3 of Billheimer *et al.*) are all based on the term-frequency matrix A .

Previously, the Patent Office asserted that Billheimer *et al.* taught creating a weighted sentence term-frequency vector, referring to col. 6, line 20-35 of Billheimer *et al.* As pointed out by the Applicants in the December 22, 2004 Rule 111 Response, the cited text referred to by the Patent Office is about information retrieval (step 201 in Fig. 8A of Billheimer *et al.*) and

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. APPLICATION NO. 09/817,591
ATTORNEY DOCKET NO. CA1122

document cross-referencing (step 218 in Fig. 8B of Billheimer *et al.*), not about creating a generic text summary of a document.

Previously, the Patent Office asserted that Billheimer *et al.* teach computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector, referring to col. 17, lines 25-35 of Billheimer *et al.* The text of Billheimer *et al.* cited by the Patent Office, however, is about a pictorial representation of a term frequency matrix. As shown in Fig. 15 of Billheimer *et al.*, each column of the matrix represents a document in a document collection, and each row represents a term found in one or more of the documents. For each entry, the raw number of occurrences of the term for the given row for the document is displayed (Billheimer *et al.*, col. 17, lines 25-30). For example, the term "apache" occurs 15 times in a Document A, 10 times in a Document C, 12 times in a Document E, and 0 time in Documents B, D, and F. Thus, the cited text referred to by the Patent Office only teaches term frequency matrix of a document. It has nothing to do with weighted sentence term-frequency vector, or computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector.

Although Billheimer *et al.* teach computing a score for a vector, the vector is a query vector, not a weighted sentence term-frequency vector. In addition, although Billheimer *et al.* disclose the calculation of relative value for the number of occurrences in Fig. 16, the relative value is still about a document, not a sentence. For example, in the Document A, the term "Apache" occurs 15 times, and the term "Rotorcraft" occurs 25 times. In Fig. 16, the relative value for the number of occurrences for the term "Apache" is $15/(15+25) = 0.375$, and the

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. APPLICATION NO. 09/817,591
ATTORNEY DOCKET NO. CA1122

relative value for the term "Rotorcraft" is $25/(15+25) = 0.625$. Thus, Applicants submit that Billheimer *et al.* fail to teach or suggest computing a score for each weighted sentence term-frequency vector in accordance with relevance to the weighted document term-frequency vector.

In the Final Office Action, the Patent Office has reiterated its position that Billheimer *et al.* disclose computing a score for each weighted sentence term-frequency vector. See pg. 20 of the April 20, 2005 Office Action. In the Office Action, the Patent Office alleges that col. 11, line 20 through col. 18, line 35 of Billheimer *et al.* discloses document decomposition based on a term basis matrix, a weight matrix and a document basis matrix. However, the Patent Office fails to point to any cogent teaching or suggestion of creating a weighted sentence term-frequency vector, or any teaching or suggestion of computing a score for each weighted sentence term-frequency vector in accordance with relevance to a weighted document term-frequency vector. The word "sentence" appears only once in the disclosure of Billheimer *et al.*, and it appears in a background discussion that denigrates techniques that parse sentences as requiring prior knowledge that difficult to construct and maintain. See col. 2, lines 43-65 of Billheimer *et al.* Applicants fail to see how the Patent Office can allege Billheimer *et al.* disclose creating a weighted sentence term-frequency vector and computing a score from such a vector when the disclosure of Billheimer *et al.* discounts methods that parse sentences and fails to even use the word "sentence" when discussing its various document matrices.

Based on the foregoing reasons, Applicants submit that claim 1 is allowable over Billheimer *et al.*, and request that the Patent Office reconsider and withdraw the § 102(e) rejection of claim 1.

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. APPLICATION NO. 09/817,591
ATTORNEY DOCKET NO. CA1122

With respect to independent claim 9, Applicants submit that claim 9 is allowable for at least reasons analogous to those discussed above with respect to claim 1. Applicants respectfully request that the Patent Office reconsider and withdraw the § 102(e) rejection of claim 9.

2. Claims 2-8 and 10-32 stand rejected under 35 U.S.C. § 103(a) as allegedly being anticipated by Billheimer *et al.* in view of Herz (U.S. Patent No. 6,029,195). Applicants respectfully traverse the § 103(a) rejection of claims 2-8 and 10-32 for at least the reasons discussed below.

The Patent Office acknowledges that Herz fails to teach or suggest a weighted sentence term-frequency vector. Since claims 2-8 depend upon claim 1 and since Herz does not cure the deficient teachings of Billheimer *et al.* with respect to claim 1, Applicants submit that claims 2-8 are allowable at least by virtue of their dependency from claim 1. Applicants respectfully request that the Patent Office reconsider and withdraw the § 103(a) rejection of claims 2-8.

Since claims 10-12 depend upon claim 9 and since Herz does not cure the deficient teachings of Billheimer *et al.* with respect to claim 9, Applicants submit that claims 10-12 are allowable at least by virtue of their dependency from claim 9. Applicants respectfully request that the Patent Office reconsider and withdraw the § 103(a) rejection of claims 10-12.

Since claims 14-20 depend upon claim 13 and since Herz does not cure the deficient teachings of Billheimer *et al.* with respect to claim 13, Applicants submit that claims 14-20 are allowable at least by virtue of their dependency from claim 13. Applicants respectfully request that the Patent Office reconsider and withdraw the § 103(a) rejection of claims 13-20.

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. APPLICATION NO. 09/817,591
ATTORNEY DOCKET NO. CA1122

As discussed in the Rule 111 Response filed December 22, 2004, claim 21 recites a method of creating a generic text summary of a document, wherein the method comprises constructing a terms-by-sentences matrix for a document; and performing singular value decomposition on the terms-by-sentences matrix to obtain a singular value matrix and a right singular vector matrix, wherein each sentence in the document is represented by a column vector of a transpose of the right singular vector matrix.

As discussed above with respect to claim 1, Billheimer *et al.* only teach a term-frequency matrix A, each entry of which is the frequency of a term in the given document; and Herz only teaches basing a target profile on the frequency with which each word appears in an article relative to its overall frequency of use in all articles. None of the cited references teaches or suggests the recited terms-by-sentences matrix.

The Patent Office has acknowledged that Billheimer *et al.* fail to teach or suggest constructing a terms-by-sentences matrix for the document, and performing singular value decomposition on the terms-by-sentences matrix, but asserts that Herz provides the features, referring to col. 16, lines 40-65 of Herz.

The text portion of Herz cited by the Patent Office discusses a general approach to recognizing synonyms, using a measure of distances between textual attribute vectors V and U, namely $\arccos(AV(AU)^t / \sqrt{AV(AV)^t AU(AU)^t})$, where the matrix A is the dimensionality-reducing linear transformation determined by collecting the vector values of the textual attribute, for all target objects known to the system, and applying singular value decomposition to the resulting collection. It appears that the Patent Office is again asserting that the collection of the

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. APPLICATION NO. 09/817,591
ATTORNEY DOCKET NO. CA1122

vector values of the textual attribute, for all target objects known to the system, teaches the terms-by-sentences matrix. However, as defined in col. 4 of Herz, a "target object" is an object available for access by the user, which may be either physical or electronic in nature. There is no teaching or suggestion in Herz that the collection of the vector values of the textual attribute for all target objects known to the system is a terms-by-sentences matrix. In addition, the purpose of Herz is to locate target objects from a vast amount of on-line information for users with particular interests. Thus, the combination of Bellheimer *et al.* and Herz fails to teach or suggest at least the construction of a terms-by-sentences matrix for a document.

Based on the foregoing reasons, Applicants submit that claim 21 is allowable over the combination of Bellheimer *et al.* and Herz, and further submit that claims 22-25 are allowable as well, at least by virtue of their dependency from claim 21. Applicants respectfully request that the Patent Office reconsider and withdraw the § 103(a) rejection of claims 21-25.

With respect to independent claim 26, Applicants submit that claim 26 is allowable over the combination of Bellheimer *et al.* and Herz for at least reasons analogous to those discussed above with respect to claim 21. Applicants further submit that claims 27 and 28 are allowable as well, at least by virtue of their dependency from claim 26. Applicants respectfully request that the Patent Office reconsider and withdraw the § 103(a) rejection of claims 26-28.

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. APPLICATION NO. 09/817,591
ATTORNEY DOCKET NO. CA1122

With respect to independent claim 29, Applicants submit that claim 29 is allowable over the combination of Bellheimer *et al.* and Herz for at least reasons analogous to those discussed above with respect to claim 21. Applicants further submit that claims 30-32 are allowable as well, at least by virtue of their dependency from claim 29. Applicants respectfully request that the Patent Office reconsider and withdraw the § 103(a) rejection of claims 29-32.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

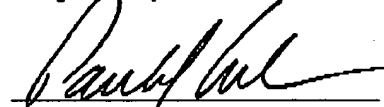
WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: July 20, 2005

Respectfully submitted,



Paul J. Willson
Registration No. 45,879

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this RESPONSE UNDER 37 C.F.R. § 1.116 is being facsimile transmitted to the U.S. Patent and Trademark Office this 20th day of July, 2005.



Mariann Tam